18. Analyse the effect of coordination on the stretching frequency of the following complexes :

(a) sulphato complex

(b) thiocyanato complex

(c) aqua complex

(d) DMSO complex

19. Discuss in detail about the principle and applications of Mossbauer spectroscopy.

20. Explain how ORD and CD help in structural elucidation of the compounds.

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APRIL/MAY 2025

23PCH41 — COORDINATION CHEMISTRY — II

Time : Three hours Maximum : 75 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL questions.

1. State Wades Rule.

2. What is the synergism for bonding involved in metal carbonyl complex?

3. Write about migratory insertion reaction.

4. Identify the important catalyst used for :

(a) hydroformylation reaction

(b) Monsanto acetic acid process.

5. What do you meant by isobestic point?

6. What is the necessary condition for IR spectroscopy?

7. In the ESR spectra of Cu(II) complex, when $g_{11} > g_{\perp} > g_e$ the unpaired electron reside in which orbital?

8. Compare the Mossbauer spectra of $[Fe(CN)_6]^{4-}$ and $[Fe(CO)_5]$.

9. Differentiate adiabatic and vertical ionization energies.

10. Describe Δ and λ isomers.

SECTION B — ($5 \times 5 = 25$ marks)

Answer ALL questions.

11. (a) Explain the structure and bonding of Zeise's salt.

Or

(b) Describe low nuclearity carbonyl clusters.

12. (a) Explain the mechanistic steps involved in the hydrogenation of alkene.

Or

(b) What do you mean by oxidative addition? Explain its mechanism and salient features.

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13. (a) Discuss the selection rules of UV-Vis spectroscopy.

Or

(b) Explain the applications of ^{15}N-NMR spectroscopy in structural identification of inorganic complexes.

14. (a) Illustrate the importance of 'g' factor in ESR spectroscopy.

Or

(b) Explain quadruple splitting in Mössbauer spectroscopy.

15. (a) Brief Koopmans' theorem.

Or

(b) Define circular dichroism. How is it differing from optical rotatory dispersion?

SECTION C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

16. Explain the molecular energy level approach for M-CO bonding with a diagram.

17. Identify the mechanistic steps involved in the oxidation of alkenes in Wacker process.